Amendments to the Claims

1. (original) A method of fabricating an optical waveguide comprising:

providing a sample of lithium niobate having one or more gratings of periodic domain inversion defined therein by electric field poling;

applying a layer of metallic zinc to a z-face of the sample, the layer having a pattern corresponding to a desired pattern of optical waveguide; and

heating the sample to cause the zinc to diffuse into, and hence alter the refractive index of, the lithium niobate so as to form an optical waveguiding structure within the lithium niobate.

2. (original) A method according to claim 1, and further comprising defining the one or more gratings in the sample of lithium niobate by performing electric field poling of the sample.

3. (original) A method according to claim 2, in which performing the electric field poling includes applying an electric field across the sample via gel electrodes applied to the +z and -z faces of the sample.

4. (currently amended) A method according to claim 1 ~~any preceding claim~~, and further comprising applying a film of metallic nickel to the z-face of the sample before applying the layer of metallic zinc, to improve adhesion of the zinc to the lithium niobate.

5. (currently amended) A method according to claim 1 ~~any preceding claim~~, in which heating the sample comprises heating the sample to a diffusion temperature at which the zinc diffuses into the lithium niobate, maintaining the sample at the diffusion temperature for a preselected length of time, and cooling the sample from the diffusion temperature, in which the heating and cooling are performed at a rate of substantially 6°C per minute.

6. (currently amended) A method according to claim 1 ~~any preceding claim~~, in which the lithium niobate contains a dopant material.

7. (original) A method according to claim 6, in which the dopant material comprises one or more of iron, magnesium and cerium.

8. (new) A method according to claim 2, and further comprising applying a film of metallic nickel to the z-face of the sample before applying the layer of metallic zinc, to improve adhesion of the zinc to the lithium niobate.

9. (new) A method according to claim 3, and further comprising applying a film of metallic nickel to the z-face of the sample before applying the layer of metallic zinc, to improve adhesion of the zinc to the lithium niobate.

10. (new) A method according to claim 2, in which heating the sample comprises heating the sample to a diffusion temperature at which the zinc diffuses into the lithium niobate, maintaining the sample at the diffusion temperature for a preselected length of time, and cooling the sample from the diffusion temperature, in which the heating and cooling are performed at a rate of substantially 6°C per minute.

11. (new) A method according to claim 3, in which heating the sample comprises heating the sample to a diffusion temperature at which the zinc diffuses into the lithium niobate, maintaining the sample at the diffusion temperature for a preselected length of time, and cooling the sample from the diffusion temperature, in which the heating and cooling are performed at a rate of substantially 6°C per minute.

12. (new) A method according to claim 2, in which the lithium niobate contains a dopant material.

13. (new) A method according to claim 3, in which the lithium niobate contains a dopant material.